

REMARKS

Entry of the foregoing and reexamination and reconsideration of the subject application, as amended, pursuant to and consistent with 37 C.F.R. § 112, are respectfully requested in light of the following remarks.

The specification has been amended to correct the structure of one of the possible members of the central core. The location of the double bond in the structure was inadvertently drawn incorrectly and resulted in a structure where a phosphorus in the ring was bonded to two nitrogen atoms, with each of these bonds being a double bond, and to two methyl groups. This results in the phosphorus atom having a non-allowed valence. The amended structure corrects this problem and is consistent with the ring structures of the other two aromatic cores from which the central core can be selected.

Claims 60-79, 81-87 and 89-51 remain in this application. Claims 1-59 were previously cancelled. Claims 92-118 were cancelled in this amendment without prejudice or disclaimer. Applicants expressly reserve the right to file one or more continuation and/or divisional applications directed to any of the cancelled subject matter. Claim 60 has been amended to incorporate the subject matter of claims 80 and 88 and to define the variables. Claim 62 has been amended to correct the structure of one of the possible members of the central core. This amended structure is the same structure amended in the specification as described above. Claims 69, 77, 78, 81, 83, 86, 87, and 89-91 have been amended to better describe the components in the claim.

No new matter has been introduced as a result of the foregoing amendments.

35 U.S.C. §112, second paragraph rejection

Claims 70, 77, 80, 81 and 88-91 have been rejected under 35 U.S.C. §112, second paragraph as failing to particularly point out and distinctly claim the subject matter which the applicant regards as the invention.

1. Claims 70, 80 and 88-91 have been rejected because allegedly the multitude of variables and possible chemicals listed as suitable for each variable is so large and diverse that the scope of the claims becomes indefinite.

Applicants direct the Examiner to § 2173.04 of the MPEP, which states:

2173.04 Breadth Is Not Indefiniteness

Breadth of a claim is not to be equated with indefiniteness. *In re Miller*, 441 F.2d 689, 169 USPQ 597 (CCPA 1971). If the scope of the subject matter embraced by the claims is clear, and if applicants have not otherwise indicated that they intend the invention to be of a scope different from that defined in the claims, then the claims comply with 35 U.S.C. 112, second paragraph.

The scope of the subject matter embraced by the claims is clear. Each element of each of these claims has been clearly defined in the claims and applicants have not otherwise indicated that they intend the invention to be of a scope different from that defined in the claims. Therefore Claims 70, 80 and 88-91 comply with 35 U.S.C. §112, second paragraph.

2. Claim 77 recites the limitation "R and R' have the meanings defined in Claim 60". The Office Action indicates that there is insufficient antecedent basis for this limitation.

Claim 77 has been amended to recite the definitions of R and R'.

3. Claim 81 recites the limitation "J and K" in line 1. The Office Action indicates that there is insufficient antecedent basis for this limitation.

Claim 81 recites "wherein J and K are equal to A and B, respectively." Claim 70, from which Claim 81 depends, provides definitions of A and B. Claim 81 indicates that J is A, while K is B. Although Applicants believe Claim 81 particularly points out and distinctly claims the subject matter which the applicant regards as the invention, the definition of J and K has been recited to match that of A and B, respectively, in a effort to further prosecution of this case and to be consistent with the other claims.

4. Claim 88 recites the limitation "-NRR" in line 1. The Office Action indicates that there is insufficient antecedent basis for this limitation.

Claim 88 has been cancelled and incorporated into claim 60. Claim 60 recites the definitions of R and R'.

5. Claim 89 recites the limitation "§, A, B, C, D, E, G, N, P, J, K, L X, m, n, and < have the meanings defined above" in line 5. The Office Action indicates that there is insufficient antecedent basis for this limitation.

Claim 89 has been amended to recite the definition of §, A, B, C, D, E, G, N, P, J, K, L X, m, n, and <.

6. Claim 90 recites the limitation "§, A', B', C, N, P, X, L, m and n have the meanings defined above" in line 5. The Office Action indicates that there is insufficient antecedent basis for this limitation.

Claim 90 has been amended to recite the definition of §, A', B', C, N, P, X, L, m and n.

7. Claim 90 recites the limitation "R" in line 3. The Office Action indicates that there is insufficient antecedent basis for this limitation.

Claim 90 has been amended to recite the definition of R.

8. Claim 91 recites the limitation "§, A", P, X, L, m and n have the meanings defined above" in line 5. The Office Action indicates that there is insufficient antecedent basis for this limitation.

Claim 91 has been amended to recite the definitions of §, A", P, X, L, m and n.

Applicants respectfully submit that Claims 70, 80 and 88-91 particularly point out and distinctly claim the subject matter which the applicant regards as the invention and the rejection of these claims should be withdrawn.

Double Patenting

Claims 60, 62-73, 75-78, 80-83 and 88 have been provisionally rejected on the ground of non-statutory obviousness-type double patenting as being unpatentable over claims 55, 58, 59, 61-66, 68-70, 72, 75-77 and 80-84 of co-pending Application No. 10/580,459 as published in U.S. Patent Application Publication 2007/0106030 on May 10, 2007. The Office Action indicates that although the conflicting claims are not identical, they are not patentably distinct from each other because the invention of the co-pending claims is in effect a "species" of the "generic" invention of the instant claims and it has been held that a generic invention is anticipated by the species.

Applicants request that this matter be held in abeyance until such time as one of the applications is otherwise allowable. It is believed to be premature to file a terminal disclaimer before the scope of the claims has been settled. In the event that the Examiner is ready to allow this application except for this rejection, she is asked to contact the undersigned so that an appropriate terminal disclaimer can be promptly prepared and filed.

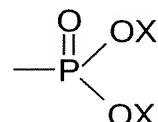
35 U.S.C. §102(b) prior art rejections

1. Claims 60-63 and 65-91 have been rejected under 35 U.S.C. §102(b) as being anticipated by Caminade et al. (WO 0053009) as shown in US 6,939,831.

It is well established that in order to demonstrate anticipation over 35 U.S.C. § 102(b), each feature of the claim at issue must be found, either expressly described or under principles of inherency, in a single prior art reference. See, *Kalman v. Kimberly-Clark Corp.*, 218 USPQ 789 (Fed. Cir. 1983).

Caminade discloses dendrimers with neutral functional groups consisting mainly of the phosphonic type. (See col. 12, line 66 - col. 13, line 2) Caminade teaches that their invention is directed towards dendrimers capable of forming a gel. (See col. 1, lines 26 - col. 2 lines 67, col. 3, line 16, col. 12, lines 14-16, and the claims). Caminade discloses dendrimers with an ammonium terminal group as gellable dendrimers, but does not exemplify other types of terminal groups. Caminade teaches using the dendrimers for agricultural uses, but does not teach or suggest using them as surface treating agents, as taught in the instant application. One of ordinary skill in the art of surface protection would not have considered the disclosure of Caminade as being relevant.

Caminade does not teach a terminal group at the end of each intermediate chain where the terminal group is composed of the group of formula:



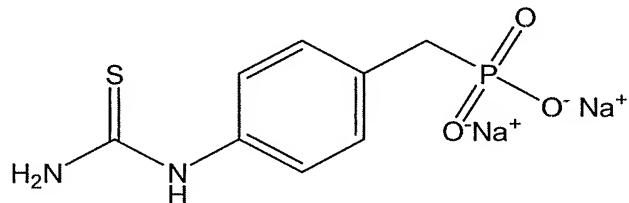
where X is methyl. The present claims are directed to dendrimers comprising monophosphonic terminal groups, which cannot form gels. However the dendrimers of Caminade are required to be gel forming. The dendrimers of the instant invention cannot be anticipated by Caminade because if the structures were the same they would necessarily have the same properties. The dendrimers claimed in the instant application are outside of the group of dendrimers taught by Caminade.

Therefore the claims of the instant application are not anticipated by Caminade because Caminade does not disclose the phosphonic terminals groups and discloses structures which are different from those of the instant claims.

Applicants respectfully submit that the claims are not anticipated by Caminade et al. and the rejection should be withdrawn.

2. Claims 60-62, 64-66, 68, 69 and 79 have been rejected under 35 U.S.C. §102(b) as being anticipated by Matthews et al. (US 6,464,971).

The Office Action indicates that the dendritic polymer of Example 24 of Matthews is of generation 4, with a central core molecule of valence 4, having generation/intermediate chains and terminal groups of the formula:



Claim 60 requires the intermediate chain to have the formula:

-J-K-L- (C2) or -L"- (C2')

where:

J represents an oxygen atom, a sulfur atom or a radical -NR-;

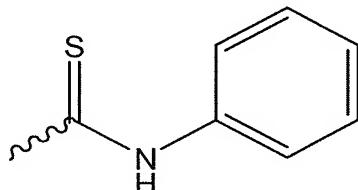
K represents an aryl, heteroaryl or alkyl radical, each of which is optionally substituted by a halogen atom or by -NO₂, -NRR', -CN, -CF₃, -OH, an -alkyl radical, an -aryl radical, or an -aralkyl radical;

L represents a hydrocarbon chain having from 1 to 6 chain members and optionally having one or more heteroatoms and/or optionally having one or more double or triple bonds, each of said chain members being optionally substituted by one or more substituents selected from -OH, -NRR', and -Oalkyl; and R and R', which are identical or different, each independently of the other represents a hydrogen atom or an -alkyl, -aryl, or -aralkyl radical; and

L" represents an -alkyl- chain having from 1 to 6 chain members, optionally substituted by one or more substituents selected from -OH, -NRR', and -Oalkyl,

where R and R', which may be identical or different, each independently represent a hydrogen atom, an alkyl radical, an aryl radical or an -aralkyl radical.

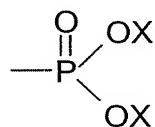
In Example 24, the intermediate chains:



are linked to the phosphonate group: $-\text{P}(=\text{O})(\text{ONa})_2$.

The intermediate chains in Example 24 cannot have the structure required in Claim 60. The definition of J in Claim 60 requires J to be an oxygen atom, a sulfur atom or a radical $-\text{NR}-$. J cannot be $-\text{C}(=\text{S})-$ as required in Example 24. The definition of K in Claim 60 requires K to be an aryl, heteroaryl or alkyl radical. K cannot be $-\text{NH}-$ as required in Example 24. The definition of L in Claim 60 requires L to be a hydrocarbon chain having from 1 to 6 chain members. L cannot be a phenyl group as required in Example 24.

Example 25 of Matthews is similar to Example 24 and has the same distinguishing feature described above. Claim 60 is further distinguished from Example 25 by the terminal functional group in Example 25, $-\text{P}(=\text{O})(\text{OEt})(\text{ONa})$. The terminal group in Claim 60 is the group of the formula:



wherein each of the radicals X, which are identical or different, represents a radical $-\text{Me}$, $-\text{H}$ and/or $-\text{M}^+$, wherein M^+ is a cation. X cannot be an ethyl group, as required by Example 25 of Matthews.

Claims 61, 62, 64-66, 68, 69 and 79 each depend from claim 60 and therefore the distinguishing feature of claim 60 also distinguishes each of these dependent claims from Matthews.

Applicants respectfully submit that the claims are not anticipated by Matthews and the rejection should be withdrawn.

35 U.S.C. §103(a) Obviousness Rejection

Claims 60-62, 67-76, 79, 80, 82, 83, 85, 86 and 89 have been rejected under 35 U.S.C. §103(a) as unpatentable over Prévôté et al.

Applicants respectfully submit that these claims are not obvious over Prévôté et al. and that all of the claims are allowable.

To establish a *prima facie* case of obviousness, three basic criteria must be met. (MPEP 2143) First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations.

Prévôté disclose dendrimers comprising terminal phosphonic groups in the form of ethyl esters or C12 alkyl esters. The Office Action acknowledges that Prévôté does not disclose dendrimers comprising a phosphonic group in the form of a methyl ester, free acid groups, or salts, as in the instant claims. The Office Action alleges that it would have been obvious to one of ordinary skill in the art at the time of the invention to use a methyl radical in place of an ethyl radical because methyl

and ethyl groups are functionally equivalent. The Office Action alleges that this is the simple substitution of one known, equivalent element for another to obtain predictable results. Prévôté discloses that while phosphates and phosphonates generally have similar properties, phosphonates have greater stability toward hydrolysis. (See Introduction)

The specification of the instant application teaches the desirability of having dendritic polymers exhibiting a terminal function -PO(OMe)₂ or -PO(OH)₂, or the corresponding salts, at the termination of each branch. (see page 1, line 7 - page 2, line 25) The specification also teaches that

However, no dendritic polymer having free phosphonic acid terminations, or optionally terminations in the form of salts or of the corresponding methyl ester, has been described. In fact, it has hitherto been impossible to prepare such functionalities on dendritic polymers. More precisely, it was impossible to prepare dendritic polymers exhibiting a phosphonic acid function starting from the corresponding alkyl esters. This has now been made possible starting from the corresponding methyl ester. (page 2, lines 12-18)

The inventors of the instant invention have surprisingly found that the methyl ester can be hydrolyzed to the free phosphonic acid group. However this was not possible with other alkyl esters, such as the ethyl ester of C12 alkyl esters of Prévôté. It was found that hydrolysis of the longer alkyl esters require reaction conditions which break down the dendrimer structure. The inventors of the instant application have unexpectedly discovered that the methyl ester can be hydrolyzed to the free acid while maintaining the structural integrity of the dendrimer. Prévôté does not teach or suggest any difference between methyl and ethyl groups on the phosphonic group. Prévôté does not teach or provide any suggestion to form dendritic polymers having terminal phosphonic groups in the form of a methyl ester,

free acid groups, or salts, as required in the instant claims. It is only through the knowledge of the inventors of the instant application that one of ordinary skill in the art would produce the currently claimed invention.

To establish a *prima facie* case of obviousness, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. There is no suggestion or motivation in Prévôté to modify the reference teachings to obtain the method of the applicants' invention. There is nothing in Prévôté that teaches or suggests the unexpected properties of the claimed dendritic polymers. Therefore, there is no suggestion or motivation, either in the cited references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference to obtain the invention of the instant application.

To establish a *prima facie* case of obviousness, there must be a reasonable expectation of success. The inventors have shown that the substitution of the methyl for the ethyl does not result in predictable results in the stability of the dendritic polymer to hydrolysis. There is no reasonable expectation of success based on the teachings in Prévôté that such differences in stability would result. Therefore there is no reasonable expectation of success in producing the applicants' invention based on the teachings in the cited prior art.

To establish a *prima facie* case of obviousness, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The Office Action acknowledges that Prévôté does not teach or suggest the use of the methyl ester, acids or salts of a phosphonic group. Nor does Prévôté teach or

suggest the unexpected results found by the inventors in making the claimed compounds. Therefore, the prior art reference does not teach or suggest all the claim limitations.

Applicants respectfully submit that the claims are not obvious over Prévôté and the rejection should be withdrawn.

In view of the foregoing, it is believed that entry of the proposed amendments should be allowed and that the record rejections cannot be maintained against the proposed claims once entered into this application. Further, favorable action in the form of a Notice of Allowance is believed to be next in order and is earnestly solicited.

Respectfully submitted,

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Date: October 27, 2008

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Date: November 6, 2008

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